

Understanding Renewable Biological Resources Through Status and Trends Science



USGS research is essential for effective management of the vast rangelands of the West. (Photo courtesy of Matt T. Lee)

Renewable resources benefit Americans by contributing food, water, fuel, medicine, employment, and recreation. These resources are used for consumptive activities – such as logging, commercial fishing, hunting, and agriculture – and for non-consumptive activities — such as hiking, bird-watching, sailing, and catch-and-release fishing. But to ensure these resources remain renewable, stakeholders, policymakers, and managers need unbiased scientific information.

Our land and its water and the inhabitants of both can tolerate some change and survive, remaining vigorous and vibrant, as long as we understand the effects of our actions and how to sustain the critical parts of the living, dynamic system they represent.

Whether it is valuable sport fisheries, increased flooding from the loss of coastal wetlands, or the devastating effects of wildfires, wise and balanced management actions and policy decisions to safeguard lives, property, and natural resources rely on scientifically solid information.

Long-term trend information reliably separates natural variability from changes that may require investigation or special management strategies. These data provide more than just information about the health of a particular population or resource: they also provide a basis for assessing the sustainability of biological resources and the effectiveness of current resource management policies and strategies. Scientific understanding of our biological resources can only lead to proactive management strategies that often prevent the need for further regulations.

Research Examples

The Great Lakes: USGS work on assessing the status and trends of deepwater aquatic communities in the Great Lakes provides information fisheries managers are using to see if management actions (such as reducing invasive sea lampreys) have helped important commercial fisheries (such as lake trout) recover. Our monitoring program helps guide decision-making in effective directions for a variety of stakeholders.

Rangelands of the West: Rangelands are those wide, open spaces so common and important in the vast landscapes of the West. Public and private land managers, including states, ranchers, and farmers, need to be able to accurately assess the status of rangelands for their wild and domestic animals and plants and to know where to focus their management activities. In one of many rangeland projects, the USGS and partners from the Agricultural Research Service, Bureau of Land Management, and the Natural Resources Conservation Service jointly developed a system of helping managers of all kinds gauge rangeland health through soil and site stability, water functions, and biological health.

The Mighty Mississippi: Whether you are a ship or barge owner, a farmer or hunter, manage public lands, or eat the food that the mighty Mississippi provides, you need information to help make effective and balanced river decisions. This requires credible scientific knowledge about a variety of factors that control the dynamics and interactions of important ecosystem



USGS works with the Wisconsin Department of Natural Resources and other partners on the Long-Term Monitoring Program for the Mississippi River. (Jeff Houser, USGS)

components of this huge river. The USGS Long Term Resource Monitoring Program is the prized diagnostic tool in the Environmental Management Program for the Upper Mississippi River System. It provides the necessary information that a multitude of stakeholders need about the status and trends of key environmental resources. This program provided information on the effectiveness of efforts to increase food for ducks and other waterbirds, on the oxygen supply for fish, on the spread of invasive snails that harbor waterbird parasites, and many other issues. The LTRMP is one of two components of the federally mandated Upper Mississippi River Restoration - Environmental Management Program. It is a cooperative program between the U.S. Army Corps of Engineers, U.S. Geological Survey, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, and the states of Illinois, Iowa, Minnesota, Missouri, and Wisconsin.

Wyoming Landscape Conservation Initiative: USGS has a leading role in this long-term, science-based program to assess and enhance aquatic and terrestrial habitats in southwest Wyoming, while aiding responsible development. This effort brings together private land owners and local interest groups with state and federal agencies in an area that encompasses some of the highest-quality wildlife habitats in the Intermountain West as well as intensive development of energy resources. USGS science provides the information needed for making balanced decisions.

Research and Monitoring Support for National Parks and Other Public Lands: Across the nation, USGS scientists conduct needed research on the country's public lands. USGS scientists are often co-located in national parks, where they work closely with parks, local universities, and other stakeholders to lead scientific research and monitoring projects that inform critical management decisions. As one example of this research, the USGS Western Ecological Research Center serves California, Nevada, and the greater Pacific Southwest — the most ecologically diverse geographic region in the U.S. and home to some of America's most popular and iconic national parks and national forests, such as Yosemite, Redwood, Point Reyes, Sequoia, and Tahoe. To support the mission of the National Park Service and the USDA Forest Service in conserving and managing these economically and ecologically important resources, USGS ecologists are co-located at six different California national parks and study several national forests, where they work together with parks and forest service managers, local universities, and other stakeholders to provide the science to help answer challenging management questions. Studies on salmon stream habitat restoration, urban roadway impacts on wildlife; biodiversity surveys; and climate change impacts are a small sample of USGS national parks studies. Studies on invasive plant removal, fire regime restoration, prescribed fire efficacy, and wildfire trends are among those contributing to multi-agency information needs.



USGS conducts research in support of management of national parks and other public lands, including Yellowstone National Park, pictured here. (USGS photo)

Economic Services in the Prairie Potholes: Americans are increasingly recognizing the essential link between healthy ecosystems and human welfare. By quantifying ecosystem and economic tradeoffs of future or proposed land-use scenarios, managers can make better decisions for society. In the Prairie Pothole region of North and South Dakota, USGS scientists examined environmental and economic tradeoffs under different land-use scenarios likely to occur over a 20-year period. "Services" include things like biological carbon sequestration, sediment reduction, and waterfowl production, and the land-uses included native grasslands, Conservation Reserve and Wetlands Reserve programs, and croplands. The resulting models demonstrated that CRP and WRP lands alone will not offset 1 for 1 the loss of native prairie, but the models allowed managers to see that scenarios in which native prairie loss was minimized and CRP/WRP lands were increased provided the most societal benefits. It also showed that land conversion in the next 20 years without the minimized loss scenario in place will result in an economic loss valued at over \$2.5 billion.

The Breeding Bird Survey: Since 1966, the Breeding Bird Survey, coordinated by USGS and the Canadian Wildlife Service, has provided vital information used by wildlife managers to assess bird conservation and management priorities. BBS data are not only used to estimate populations (now available for



Black skimmers in flight. The Breeding Bird Survey provides vital information for U.S. wildlife managers. (©, photo courtesy of Michael Lutmerding)

more than 420 bird species) and help set management priorities and successes, but they are also used for bird-disease work (such as understanding the spread and virulence of West Nile virus), climate change, and the effects of habitat change and fragmentation.

For more information

visit http://ecosystems.usgs.gov/status_trends/ or contact

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